Art. XII.—*Magnetic Deflection of β-Rays: Tabulation of* v *against* RH *assuming Lorentz Theory.*

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The negative electron, when it possesses a velocity v cms/sec, is deflected by a uniform magnetic field, H gauss, at right angles to its direction of motion, into a circular path of radius R cms. such that $RH = vm/e$, m grams being the transverse mass of the negative electron for a velocity v cms/sec. $m = m_o\phi(\beta)$, where $\beta = v/V$, V cms/sec being the velocity of light. In experiments on cathode and β rays it is frequently necessary to calculate the velocity of the rays when RH is known. Since e/m_o is now well known, and Lorentz's theory that $m = m_o(1-\beta^2)^{-\frac{1}{2}}$ has been confirmed by Bucherer, it is convenient to tabulate v with RH as argument.

The following values for e/m_o have been obtained by different observers :—

Bucher	1908	1.763×10^7 E.M.U.gm^{-1}
Classen	1908	1.776
Wolz	1909	1.767
Lerp	1911	1.72
Malassez	1911	1.769
Bestelmeyer	1911	1.75
Bestelmeyer	1911	1.766
Alberti	1912	1.756
Jones	1914	1.75

From a consideration of these the value 1.763×10^7 was chosen for e/m_o. The velocity of light was taken as 2.9986×10^{10} cms/sec.

The table expresses RH in gauss-cms and v in 10^8 cms/sec. Example: If RH = 2315 gauss-cms. then $v = 241.64 \times 10^8$ cms./sec.

RH	v 0	10	20	30	40	50	60	70	80	90	Mean Differences. 1	2	3	4	5	6	7	8	9
0 -	.0	1.763	3.526	5.288	7.050	8.811	10.571	12.331	14.088	15.845	176	352	528	704	880	1056	1232	1408	1584
100 -	17.600	19.353	21.104	22.852	24.599	26.343	28.084	29.822	31.588	32.290	174	348	523	697	871	1045	1219	1394	1568
200 -	35.02	36.74	38.46	40.18	41.89	43.60	45.31	47.01	48.71	50.40	17	34	51	68	85	102	119	137	154
300 -	52.09	53.77	55.44	57.11	58.78	60.44	62.09	63.74	65.38	67.02	17	33	50	66	83	99	116	132	149
400 -	68.65	70.27	71.89	73.50	75.10	76.70	78.29	79.87	81.44	83.01	16	32	48	64	80	96	111	127	143
500 -	84.57	86.12	87.67	89.21	90.74	92.26	93.78	95.29	96.78	98.27	15	30	46	61	76	91	106	122	137
600 -	99.76	101.23	102.69	104.15	105.60	107.04	108.47	109.90	111.31	112.72	14	29	43	57	72	86	101	115	129
700 -	114.12	115.51	116.89	118.27	119.63	120.98	122.33	123.67	125.00	126.32	14	27	41	54	68	81	95	108	122
800 -	127.63	128.93	130.23	131.51	132.78	134.05	135.31	136.55	137.79	139.02	13	25	38	50	63	76	88	101	113
900 -	140.24	141.46	142.66	143.85	145.04	146.22	147.39	148.56	149.71	150.85	12	23	35	47	59	70	82	94	106
1000 -	151.98	153.10	154.22	155.32	156.42	157.51	158.60	159.67	160.74	161.79	11	22	33	43	54	65	76	87	98
1100 -	162.84	163.88	164.91	165.94	166.95	167.96	168.96	169.94	170.93	171.90	10	20	30	40	50	60	70	80	90
1200 -	172.87	173.82	174.77	175.71	176.65	177.58	178.50	179.41	180.31	181.21	9	18	28	37	46	55	65	74	83
1300 -	182.10	182.98	183.85	184.71	185.57	186.42	187.26	188.10	188.93	189.75	8	17	25	34	42	51	59	68	76
1400 -	190.57	191.38	192.18	192.97	193.76	194.54	195.31	196.08	196.84	197.59	8	16	23	31	39	47	54	62	70
1500 -	198.34	199.08	199.81	200.54	201.26	201.98	202.69	203.40	204.09	204.77	7	14	21	28	36	43	50	57	64
1600 -	205.46	206.14	206.81	207.48	208.14	208.79	209.44	210.08	210.72	211.35	7	13	20	26	33	39	46	52	59
1700 -	211.98	212.60	213.21	213.83	214.43	215.03	215.63	216.22	216.81	217.38	6	12	18	24	30	36	42	48	54
1800 -	217.95	218.52	219.08	219.64	220.20	220.75	221.29	221.83	222.36	222.89	5	11	16	22	27	33	38	44	49
1900 -	223.42	223.94	224.46	224.97	225.48	225.98	226.48	226.97	227.46	227.95	5	10	15	20	25	30	35	40	45
2000 -	228.43	228.91	229.38	229.85	230.31	230.77	231.23	231.68	232.13	232.58	5	9	14	18	23	27	32	37	41
2100 -	233.01	233.45	233.89	234.32	234.75	235.17	235.59	236.01	236.42	236.83	4	8	13	17	21	25	30	34	38
2200 -	237.23	237.63	238.03	238.42	238.82	239.20	239.59	239.97	240.35	240.72	4	8	12	15	19	23	27	31	35
2300 -	241.09	241.46	241.83	242.20	242.56	242.91	243.26	243.62	243.96	244.31	4	7	11	14	18	21	25	28	32
2400 -	244.65	244.99	245.32	245.66	245.99	246.32	246.65	246.97	247.29	247.61	3	7	10	13	16	20	23	26	30
2500 -	247.93	248.24	248.55	248.85	249.16	249.46	249.76	250.06	250.36	250.65	3	6	9	12	15	18	21	24	27
2600 -	250.94	251.22	251.50	251.79	252.07	252.35	252.63	252.91	253.18	253.45	3	6	8	11	14	17	19	22	25
2700 -	253.72	253.99	254.25	254.51	254.77	255.02	255.28	255.53	255.78	256.03	3	5	8	10	13	15	18	20	23
2800 -	256.28	256.53	256.76	257.01	257.25	257.49	257.73	257.97	258.20	258.43	2	5	7	10	12	14	17	19	21
2900 -	258.66	258.88	259.11	259.33	259.56	259.78	260.00	260.21	260.43	260.64	2	4	7	9	11	13	15	18	20
3000 -	260.85																		

	v										Mean Differences.								
RH	0	100	200	300	400	500	600	700	800	900	10	20	30	40	50	60	70	80	90
3000 -	260.85	262.89	264.78	266.54	268.18	269.70	271.12	272.45	273.69	274.86	15	30	45	60	76	91	106	121	136
4000 -	275.95	276.97	277.93	278.83	279.69	280.49	281.25	281.96	282.64	283.28	8	16	24	32	40	48	56	63	71
5000 -	283.88	284.46	285.00	285.52	286.00	286.47	286.92	287.34	287.74	288.13	5	9	14	18	23	28	32	37	41
6000 -	288.49	288.84	289.18	289.50	289.80	290.09	290.37	290.64	290.90	291.15	3	6	9	12	14	17	20	23	26
7000 -	291.38	291.61	291.83	292.04	292.24	292.43	292.62	292.80	292.98	293.14	2	4	6	8	10	12	13	15	17
8000 -	293.30	293.46	293.61	293.76	293.90	294.03	294.16	294.28	294.40	294.52	1	3	4	5	7	8	9	11	12
9000 -	294.64	294.76	294.87	294.97	295.07	295.17	295.26	295.35	295.44	295.53	1	2	3	4	5	6	7	8	9
10,000 -	295.62																		

	v										Mean Differences.								
RH	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	100	200	300	400	500	600	700	800	900
10,000 -	295.62	296.34	296.89	297.33	297.67	297.95	298.19	298.38	298.53	298.66	3	6	10	13	16	19	22	25	29
20,000 -	298.79	298.89	298.97	299.04	299.11	299.17	299.22	299.27	299.31	299.34	1	1	2	2	3	4	4	5	5
30,000 -	299.38	299.41	299.45	299.47	299.49	299.51	299.53	299.54	299.56	299.58	0	0	1	1	1	1	1	2	2
40,000 -	299.59	299.60	299.61	299.62	299.63	299.64	299.66	299.67	299.68	299.68	0	0	0	0	1	1	1	1	1
50,000 -	299.69																		

	v										Mean Differences.								
RH	0	10,000	20,000	30,000	40,000	50,000	60,000	70,000	80,000	90,000	1000	2000	3000	4000	5000	6000	7000	8000	9000
50,000 -	299.60	299.74	299.77	299.79	299.81	299.82	299.82	299.83	299.83	299.84	0	0	0	1	1	1	1	1	1
150,000 -	299.84	299.84	299.84	299.85	299.85	299.85	299.85	299.85	299.85	299.85	0	0	0	0	0	0	0	0	0
250,000 -	299.85																		